



FOREST PEST MANAGEMENT

Pacific Southwest Region

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Ambrosia Beetle (Coleoptera: Platypodidae) Infestation in White Fir,
Strawberry Recreation Residence Tract, Live Wire Settlement Timber Sale,
Placerville District, Eldorado NF

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In early November, 1996, while marking trees for removal as part of the Live Wire Settlement Timber Sale, Placerville District personnel noticed boring dust on the lower bole of about 75 white fir in and around the Strawberry Recreation Residence Tract. Although a few of the fir exhibited some crown fade, the majority of the trees appeared healthy except for the boring on the lower bole. On November 7, 1996, John Wenz, entomologist and Alan Somers, Mike Grimm, and Terry Newkirk from the Placerville District, visited the site. The purpose of the visit was to assess the survival potential of the trees exhibiting the boring dust and discuss management options.

The Live Wire Timber Sale is part of a projected 10-year hazard reduction and maintenance program for protection of Pacific Gas and Electric power lines along the Highway 50 corridor from Pacific House east to Echo Summit. Part of the sale area includes the 52 unit Strawberry Recreation Residence Tract located at 5820 feet in elevation between Highway 50 and the south fork of the American River. If the infested trees are going to die as a result of the attacks, they would be marked for removal by the spring of 1997 as part of the Live Wire sale to reduce hazards to PG&E power lines as well as cabins, other structures and public use in the recreation tract.

Observations

The white fir exhibiting the boring dust ranged from about 12 to 36 inches DBH. The stand is approximately 75% white fir in association with incense-cedar, and ponderosa, Jeffrey and sugar pines. Stocking levels in many parts of the stand ranged from 400 to 540 sq. ft./acre. Examination of the affected fir showed they were being attacked by the ambrosia beetle, Platypus wilsoni, (Coleoptera: Platypodidae). Adult male beetles were found boring in both the outer and inner bark and in the xylem. In several of the fir, there



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was extensive boring in the outer bark with no indication that the boring extended into the xylem or even the inner bark region. In some, boring had continued into the xylem as evidenced by the characteristic "pinholes" in the sapwood, sometimes with an adult beetle mining in the gallery.

Two general types of boring dust were observed. One tended to be reddish to light brown consisting of a mix of moderately sized splinterlike to pellet shaped particles. The other was white in color and splinterlike in shape. Occasionally, click beetle (Coleoptera: Elateridae) larvae were found associated with boring/galleries in the outer bark. Most of the infested trees appeared to have healthy crowns showing no signs of fade and with no evidence of attack by fir engravers, Scolytus sp. (Coleoptera: Scolytidae). Two trees that did have faded crowns had been attacked by the fir engraver, S. ventralis and the roundheaded fir borer, Tetropium abietis (Coleoptera: Cerambycidae) in addition to ambrosia beetles.

Biology

Platypus wilsoni is found along the Pacific Coast from British Columbia south to California and east to Idaho. Its main conifer hosts are Douglas fir, western hemlock, and true firs. A smaller, related species, P. abietis, attacks white fir in Utah, New Mexico and Arizona. It usually attacks unthrifty, weakened, fire injured, dying, recently dead standing trees and freshly cut logs. Healthy trees are rarely affected but, if attacked in sufficient numbers, may be killed.

In addition to P. wilsoni in the family Platypodidae, western ambrosia beetles are also found in the bark beetle family Scolytidae and include the genera Gnathotrichus, Monarthrum, Trypodendron and Xyleborus. In contrast to the bark beetles, ambrosia beetles do not feed on the wood but rather on ambrosia fungi brought into the galleries by the adult beetles. Both adults and larvae feed on the fungi. The ambrosia fungi tend to be fairly species specific; Raffaelea canadensis is the species cultivated and fed on by P. wilsoni and is primarily disseminated by the female beetles.

Much of the information on the biology of western Platypodidae comes from work done in British Columbia. Adults fly and attack new hosts from mid-July to mid-September but there may be a more extended flight and host selection/colonization period in the southern parts of its range. The adult males initiate gallery construction and may bore an inch or more into the tree before being joined by a female. The galleries extend through the bark into the xylem and frequently into the heartwood. Several secondary tunnels are usually excavated horizontally from the main gallery creating an extensive, complex, gallery system. Eggs are deposited toward the end of the tunnels in loose groups of 20 to 40. Developing larvae move freely in the galleries and at maturity, construct chambers in the walls of the galleries in which pupation and transformation into adults occurs. Adults and larvae overwinter and development takes a year or more.

Discussion

As noted above, ambrosia beetles usually attack weakened, dying or recently dead trees. It is generally thought that such unthrifty trees produce odors

that insects, in this case, ambrosia beetles, can detect and track to the source host tree. This mechanism for host tree selection is called "primary attraction" and has been demonstrated for several scolytid ambrosia beetles. Despite the lack of obvious signs of stress at this point in time, it is unlikely that the moderate-to-high level of ambrosia attacks seen in the Strawberry Recreation Residence Tract would occur if the trees were not producing odors characteristic of weakened and dying trees. It is also likely that the ambrosia beetle-attacked trees have fir engraver attacks in the upper bole not easily detectable from the ground and that the crowns have not yet started to fade. It would be somewhat atypical if these trees did not exhibit crown fade and die by next spring/ summer and it would be reasonable to remove them this winter/spring as part of the Live Wire hazard reduction sale.

However, since most of the trees attacked appeared otherwise healthy at this time it and since some of the attacks may be unsuccessful (i.e., not extend into the xylem), there is some level of uncertainty with respect to tree survival and a consequent risk of removing trees that might otherwise survive. Given these circumstances and the desirability of retaining trees in the Strawberry Tract, an option would be to monitor infested white fir for at least a year. This would provide an opportunity to assess survival, investigate more thoroughly associated factors should mortality occur and negate the risk of removing trees that would otherwise survive. If the attacked trees do die, a second entry into the stand would be needed to conduct salvage/ hazard removal operations.

As noted above, stocking levels within the Strawberry Tract are high and the stand is at an increased risk of fir engraver attack due to reduced host vigor resulting from between tree competition. From this perspective, if the ambrosia beetle-attacked fir die, there may be some residual benefit due to reduced competition although the trees that die cannot be selected as in a thinning operation.